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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/715,899	11/18/2003	Michael F. Deering	5181-09612	5662

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Jeffrey C. Hood
Meyertons, Hood, Kivlin, Kowert & Goetzel, P.C.
P.O. Box 398
Austin, TX 78767

EXAMINER

NGUYEN, PHU K

ART UNIT	PAPER NUMBER
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2673

DATE MAILED: 06/01/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/715,899

Applicant(s)

DEERING

Examiner

Phu K. Nguyen

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 27 December 2004.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-15, 19-22, 24 and 25 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-15, 19-22, 24 and 25 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Phu K. Nguyen

PHU K. NGUYEN
PRIMARY EXAMINER
GROUP 2300

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____.

- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date: _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

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The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-15, and 19-22, 24-25 are rejected under 35 U.S.C. 103(a) as being unpatentable over FORAN et al. (6,072,500) in view of LIN et al. (A Parallel Rendering Approach to the Adaptive Supersampling Method).

As per claim 1, Foran teaches the claimed "graphics system" comprising: a graphics processor configured to generate a plurality of samples (Foran, scan conversion subsystem 14), wherein the graphics processor generates at least a portion of the plurality of samples in a super-sampled manner (Foran, supersampling coverage mask); a sample buffer coupled to said graphics processor for storing the plurality of samples having the variable density, wherein the plurality of samples comprised in the sample buffer correspond to an entire frame of a display (Foran, image processor buffer 52; column 5, lines 41-65); and a sample-to-pixel calculation unit coupled to said sample buffer, wherein said sample-to-pixel calculation unit is configured to select and filter said stored samples to form output pixels, (Foran, image processors 60; column 6, lines 9-32); "wherein the output pixels correspond to the entire frame of the display" (Foran, the output pixels to the display subsystem 18 are used to represent the screen of the display 20). It is noted Foran does not teach "pixels are rendered with a variable density of samples, wherein the density varies with pixel location" as claimed. However, Lin teaches that such "variable density of samples per pixel, wherein the density varies

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with pixel location" is well known in the art (Lin, page 513, figure 2b; the adaptive supersampling method). It would have been obvious to use an adaptive supersampling method for "variable density of samples per pixel, wherein the density varies with pixel location" because provides a considerable amount of saving in both memory and processing time compared to the traditional supersampling method (Lin, page 512, lines 18-21).

Claim 2 adds into claim 1 "wherein said graphics processor is configured to vary the density of the samples generated per pixel on a basis selected from the group consisting of: a per-scan line basis, a per-group-of-scan-line basis, a per-region basis, a per-pixel basis, and a per-group-of-pixel basis" which Foran teaches in column 12, line 32 to column 13, line 55 in which the sub-samples are combined to yield the value of pixel in each specific region.

Claim 3 adds into claim 1 "wherein said density is varied according to one or more of the following: input from an eye-tracking device, input from a head-tracking device, input from a hand-tracking device, input from a mouse, a cursor position, a visible object position, and a main character position" which Foran teaches in column 3, lines 50-54, column 4, lines 11-30 in which the input is from host computer 10 with the polygon information.

Claim 4 adds into claim 1 "said density is varied according to input from a gaze tracking device" which Foran does not explicitly teach. However, given Foran's

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graphics processor 10, it would have been obvious to a person of ordinary skill in the art to have the input with varied density from a gaze tracking device because the accuracy and easy manipulation of the gaze tracking device.

Claim 5 adds into claim 1 "said density is selected on a per frame region basis from a predetermined group of densities" which Foran teaches in column 4, lines 6-17.

Claim 6 adds into claim 1 "said density is substantially continuously variable across one or more frame region boundaries" which Foran does not explicitly teach. However, given Foran's antialiasing technique, it would have been obvious to have the density being substantially continuous because it reduces artifacts by smoothing the appearance of the displayed image.

Claim 7 adds into claim 1 "said sample-to-pixel calculation unit is configured to filter samples to form output pixels on a real time basis" which Foran teaches in column 14, lines 6-26 in which the speed of operation significantly improves.

Claim 8 adds into claim 1 "said sample-to-pixel calculation unit is configured to filter samples to form output pixels on an on-the-fly basis" which Foran teaches in column 13, lines 37-55.

Claim 9 adds into claim 1 "at least a part of each sample is double-buffered in said sample buffer" which Foran does not explicitly. However, given Foran's image buffer for graphics data, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to use the double-buffer for storing data because it reduces the processing time by allowing simultaneously read and write operations perform on the buffer.

Claim 10 adds into claim 1 "a sample position memory coupled to said graphics processor, wherein said sample position memory is configured to store information usable to determine sample positions" which Foran teaches in column 5, line 66 to column 6, line 8.

Claim 11 adds into claim 1 "a sample position memory coupled to said graphics processor, wherein said sample position memory is configured to store one or more sample position schemes, and wherein said graphics processor is configured to read sample positions from said sample position memory" which Foran teaches in column 5, line 66 to column 6, line 32.

Claim 12 adds into claim 1 "a sample position memory coupled to said graphics processor, wherein said sample position memory is configured to store one or more sample position schemes for one or more sample densities, wherein said graphics processor is configured to read sample positions from said sample position memory

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according to a selected sample density and a selected sample position scheme” which Foran teaches in column 5, line 66 to column 6, line 32; column 7, lines 31-49.

Claim 13 adds into claim 1 “said samples are stored in said sample buffer according to bins, wherein each bin has a position, wherein said sample position memory is configured to store said sample positions as offsets relative to said bin positions” which Foran does not teach. However, given Foran’s image region memories 52, it would have been obvious to arrange the memory into the sections such as bins because it increases the memory access time by allowing a group of pixel data to be processed simultaneously.

Claim 14 adds into claim 13 “said bin positions corresponds to pixel positions on a display device” which Foran does not explicitly teach. However, given Foran’s sample mask at each pixel position (column 4, lines 9-11), it would have been obvious to represent each bin as the pixel containing the values of samples for that pixel because it increases the memory access time by allowing a group of sample data for each pixel to be processed simultaneously.

Claim 15 adds into claim 1 “said graphics processor is configured to store said samples into said sample buffer according to bins, and wherein said bins correspond to screen space areas” which Foran does not teach. However, given Foran’s image

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region memories 52 and sample mask at each pixel position (column 4, lines 9-11), it would have been obvious to arrange the memory into the sections such as bins according to screen space area because it increases the memory access time by allowing a group of pixel data to be processed simultaneously.

Claims 19-22 claim a graphics system based on the graphics system of claims 1-18, therefore, they are rejected under the same reason.

Claims 24-25 claim method based on the system of claims 1-19; therefore, they are rejected under the same reason (see also Foran, column 15, lines 37-42.)

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of

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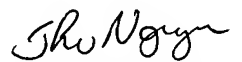
the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Phu K. Nguyen whose telephone number is (571) 272 7645. The examiner can normally be reached on M-F 8:00-4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, bipin Shalwala can be reached on (571) 272 7681. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Phu K. Nguyen
May 25, 2005


PHU K. NGUYEN
PRIMARY EXAMINER
GROUP 2300